

Integrating Information Systems Education Into Competitive Intelligence Education At Four Levels: K-12 To Post-Graduate

Katherine M. Shelfer
Kathy.Shelfer@cis.drexel.edu
College of Information Science & Technology
Drexel University
Philadelphia, PA 19104-2875 USA

Abstract

Today's Information Systems (IS) curriculum is evolving to respond to the globalization and diversification of information space. IS educators continue to expand traditional definitions of information work, and to offer courses that extend beyond the boundaries of contemporary uses of IS. This is a key to the continued long-term relevance of IS programs in traditional academic institutions. Information systems provide critical support for the functions of knowledge management (KM) and competitive intelligence (CI). Beginning with a brief overview of the current state of CI education, this paper discusses one university's ongoing efforts to embed more effective instruction in CI systems as a core component of IS education. The goals for content redesign are to include greater exposure to creative applications of IS, focus on the need to recruit and retain IS students, provide experiential learning to familiarizes students with emerging technologies, encourage innovation and creative use of emerging IS technologies, support career objectives of graduate students and IS practitioners and meet the business objectives of employers. The results, in the form of student projects and presentations, have validated this approach.

Keywords: Competitive Intelligence, Curriculum, Syllabus, Certificate, Postgraduate, Graduate, Undergraduate, and High School

1. BACKGROUND

Information is not bound to buildings and Information systems (IS) professionals no longer limit their concerns to the constraints of functional areas, strategic business units, or supply chains (Kristl, 1999; St. Lifer and Rogers, 1998). Employers are increasingly aware of the value of IS systems, including their potential to provide a competitive advantage. However, employers expect a measurable return on that investment. Today's IS curriculum is evolving to respond to the globalization and diversification of information space. Colleges of business, library schools, communication programs, computer sciences departments and others who are involved with IS education are continually redefining themselves and developing new avenues of cooperation and collaboration. A key emerging focus is that of competitive intelligence systems design and deployment. Where knowledge management (KM) focuses on the identification, management and use of (primarily) internal data, CI generally works with data that is external to the organization, although the best advantage comes with a blend of KM and CI.

Competitive Intelligence Defined

The Society of Competitive Intelligence Professionals (SCIP), headquartered in both the United States and Belgium, has a membership of over 6,900. SCIP members work in a broad variety of industries and have backgrounds in accounting and finance, chemistry, engineering, market research, medicine, government intelligence, information systems, and library science. Use of IS can provides a common denominator, although the capabilities and specifics of these systems vary widely. The SCIP website (<http://www.scip.org/ci/>) defines Competitive Intelligence (CI) as:

The process of monitoring the competitive environment. CI enables senior managers in companies of all sizes to make informed decisions about everything from marketing, R&D, and investing tactics to long-term business strategies. Effective CI is a continuous process involving the legal and ethical collection of information, analysis that doesn't avoid unwelcome conclusions, and controlled dissemination of actionable intelligence to decision makers.

specific collection of personal attributes is the engine that drives the required CI knowledge base/skills set which result in the analytical techniques necessary to the development of actionable intelligence--or recommendations for action that are based on scenarios and forecasts.

2. Competitive Intelligence Education

At one university, the mission of the College of Information Science and Technology is to advance, through teaching and research, the information field - integrating its human, social, and technological aspects and laying its intellectual foundations. Founded in 1892, the College has a current enrollment of some 1100 students: 25 doctoral and post-master's students, 500 master's students, and about 575 undergraduates in the following undergraduate and graduate degree programs:

- Bachelor of Science in Information Systems (BSIS)
- Master of Science (MS) in Library and Information Science
- Master of Science in Information Systems (MSIS)
- Master of Science in Software Engineering (MSSE)
- PhD

Throughout the College of Information Science and Technology, CI content is adapted to meet the needs of four distinct groups of students:

- Professional continuing education program leading to a certificate.
- Certificate embedded in the graduate degrees of the College.
- Undergraduate course.
- Instruction provided at the high school level.

CI education with a strong IS component has proven to be a popular and effective means of:

- Building bridges between faculty in different disciplines.
- Building academic corporate partnerships, and
- Reinforcing the value gained through multidisciplinary approaches and the inclusion of diverse points of view.

It has also proven to be an effective way in which to motivate high school students and undergraduates to improve their skills in online searching and content evaluation as well as to introduce them to various IS career options. In order to introduce students to computer supported collaborative learning, a variety of tools and technologies, including analyst's workbench software, are included in the program.

3. CI CERTIFICATE PROGRAM

The CI Certificate program was developed to integrate the traditional skills and abilities of librarianship with the core skills and abilities of graduate students and post-graduate CI practitioners. The content was developed in collaboration with CI practitioners and corporate partners from across the country. These individuals remain involved as advisors and consultants, in that they evaluate curriculum, provide content, suggest best uses of IS, and critique student fieldwork and course presentations.

The certificate program provides proof of baseline competencies in CI as well as a variety of related skills including the ability to work in IS-supported virtual teams and to share insights and lessons learned. Evidence of ability is generated in the form of a portfolio piece for each module.

The certificate program is an introduction to IS systems used to mine for information. At its core is a typical library science emphasis on the use of secondary business information resources and business information systems that has been redesigned to meet the needs and interests of IS students. Despite the fact that little formal training is available to those who wish to become CI professionals, there has been a backlash against librarians and other information professionals involved in CI. This author has attended many SCIP sessions in which librarians have been "bashed" (ever so politely). Therefore, use of the "L" word is minimal.

The CI Certification program consists of a series of course-length modules delivered on-line. This certificate is available to practicing information professionals involved in strategic decision-making. Most of these students have graduate degrees in a variety of technical and business disciplines, such as chemical engineering, computer science or marketing. A few are librarians who have been pressed into service as information analysts for their corporate employers.

The common thread is the individual's need to identify, interpret, forecast and suggest responses to changing conditions in a dynamic and discontinuous operating environment. CI certification is also awarded to graduate students in the Information Systems, Software Engineering, and Library Science Masters Degree programs, upon completion of a similar sequence of courses.

CI Certificate Modules

There are three core modules. The format of Module I reflects the traditional instructional model for Business Reference. Module II provides an overview of the strategic use of various aspects of IS, including internets, intranets and extranets. It reinforces systems requirements elicitation, the development of alternative solutions to a problem and the development of a project proposal. Module III integrates the content of the first two modules with an introduction to tools and techniques commonly used in CI.

Module I -Business Information Tools

A wide variety of electronic and print resources are introduced, compared and used in information scavenger hunts that are designed to provide additional insights into factors that drive a query and impact the results. Student assignments include:

- Prepare and submit a written research report.
- Prepare and submit an annotated research guide.
- Prepare and present an executive briefing.

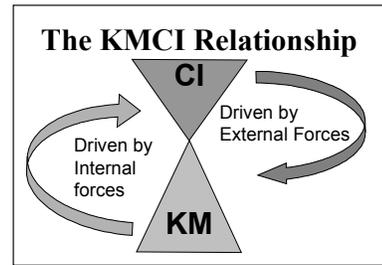
Research topics are selected from among those requested by senior managers of regional, national and global companies. Students are required to demonstrate knowledge and appropriate use of relevant topical resources identified in the module. The ability to select and use appropriate secondary business resources requires students to think critically about both the conceptual area related to the topic and the impact of information systems on access to (1) similar content; (2) economic, nationalistic and regional data collection and dissemination; and (3) distribution channels. Students compare results extracted from different resources to gain insights into content quality, methodology, vocabulary, hierarchy, interface options, biases and market assumptions. The exit competencies for this course are designed to help participants:

- Acquire a basic vocabulary and conceptual awareness of general business research.
- Identify and use major sources for company, industry and market research.
- Identify and select the best source from similar sources in various formats.
- Analyze queries in preparation for searching.
- Select appropriate methods and sources to respond to these queries.
- Be aware of the significance, use and misuse of economic and demographic data.
- Identify and use core value-added print and electronic resources to prepare and present an analysis of a specific business research need.

Module II -Information Services to Organizations (Knowledge Management)

The KMCI model (below) is used to orient this course in a more holistic fashion. The functional approach to KM views the mission and structure of IS/IT from the context of support for the functional imperatives and strategic goals of the organization. For this reason, military and business classics are first surveyed for what they teach about (1) the importance of using external intelligence to drive internal information systems design and implementation; and (2) the importance of the human dimension. This perspective is incorporated into dozens of short case reports on the design, implementation and integration of internet, intranet and extranet services that are intended to solve business

problems and provide competitive advantage. Through the classics, students are first introduced to (1) the strategic and tactical importance of intelligence,



(2) the structure of learning organizations, and (3) the core competencies of KM as they relate to CI. Through case reports of innovative approaches to information services in organizations and projects that involve requirements analysis, students evaluate human and economic factors in addition to the technological parameters related to the design and implementation of IS/IT. Principal topics of this course include:

- Perspectives of important military strategists and others regarding intelligence.
- Elements of information systems and services.
- Strategic use of information systems.
- Operational uses of information systems and services.
- Implementation of information systems and services.
- Technology selection and assessment.
- Related ethics and cost benefit issues.

Classic readings related to strategy, business, communication and sociology are used to supplement readings in knowledge management in order to foster critical thinking skills useful in case analysis and to prepare for the CI course.

Where Module I relies on a lecture/discussion model, this course is experimental and continually evolving due to advances in IS/IT. Initially it focused almost entirely on using legacy systems to support functional imperatives. It was refocused on the strategic use of internet, intranet and extranet technologies to solve business problems and create competitive advantage. Today, this module requires students to evaluate knowledge throughput of their own organizations (or one to which they have access) for the purpose of identifying and resolving dissolving bottlenecks. The focus is use of IS to create strategic linkages between internal (KM) and external information (CI); that is, between functional areas, suppliers; and customers. Today, this course provides insights into the strategic and tactical advantages to be obtained through KM.

The exit competencies are to:

- Understand the structures of organizations and the functions of information acquisition, storage, retrieval and analysis within them.
- Know the information needs in strategic organizational planning and management.
- Analyze organizations in terms of information life cycle and information processes.
- Develop information services for organizational problem solving.

Module III -Competitive Intelligence

This course provides immersion, guided practice and immediate feedback. Choreographed cases focus on the unique challenges related to dynamic and discontinuous environments such as merging technologies, merging industries and emerging global competition. Topics include:

- Needs assessment
- Acquisition, preparation and delivery of actionable intelligence.
- Models
- Metrics
- War games
- Ethics
- Counterintelligence; and hands-on use of CI software(s).

Practicums are currently offered in information-intensive organizations, including technology transfer offices, companies in medical and health-related industries, electronic commerce, and smart card systems, among others. This capstone course presumes the student comes prepared with

- Ability to effectively use appropriate secondary resources.
- Basic knowledge of key business topics.
- Skill in information needs analysis.
- Basic understanding of information services in organizations.

After a brief introduction to the process of establishing and managing the continuous process of CI, the balance of the course covers the identification, extraction, filtration and analysis of relevant patent, financial, production, and market data useful for an organization's strategic, tactical and operational decision-making.

Case choreography, discussed in a separate section below, is used to encourage students to effectively prioritize, analyze, integrate, document and present the intelligence value extracted from hidden knowledge. The course concludes with a discussion of CI ethics and the various security issues related to acquiring and protecting key business information.

4. UNDERGRADUATE EDUCATION IN COMPETITIVE INTELLIGENCE

The Undergraduate Program at Drexel University's College of Information Science and Technology defines information systems broadly to include information itself, people, policies, and procedures, as well as computer hardware and software. As information technology becomes more powerful, a broad focus on all aspects of the system becomes more important if the information to be provided meets the competitive needs of companies and industries.

The program integrates information systems courses into a carefully planned arts and sciences education. The first year's information systems courses are specifically designed to prepare the student for the first co-operative education assignment. In addition to information systems courses, students take courses such as psychology, computer science, mathematics, and composition. The curriculum produces an information professional with a strong balance of technical and people skills.

The information systems major is designed to be completed in 5 years, including 18 months of co-op. Students pursue on-campus studies in the fall, winter, and spring terms of their freshman and senior years. In their sophomore, pre-junior, and junior years, they spend all 4 terms (fall, winter, spring, and summer) either in class or on co-op.

At the undergraduate level, junior and senior students in the BSIS program may enroll in INSYS 435 an elective course in CI that replaces an older, now defunct, course in online searching. This earlier course was perceived by students to be a "library course" and as such was subject to low enrollment. In the spring of 1998, it was decided to redesign the course. The goal was to preserve much of the online searching and evaluation components within a framework that would be of value to students in the BSIS program. The decision was made to embed online searching within a CI course structure that emphasized strategic analyses of published information. The online searching component was expanded to include Web-based information and a unit on critical evaluation of Web resources.

The current course examines electronic services that deliver "published" information to an organization from external sources, and relates these services to functions such as planning, marketing, and research. It also demonstrates ways of monitoring the organization's larger environments, such as the economy, government, competitors, and new technologies. The course introduces students to the core concepts of information services as they apply to the essential techniques for retrieving, analyzing, organizing and presenting information. The overall goal of the course is for each student to be capable of producing a systematic and accurate method for recovering, analyzing, and disseminating needed information in any setting. This

course centers on the completion of a competitive intelligence project through requirements analysis, intelligence gathering, SWOT analysis, and targeted briefing.

Major Course Objectives

The major course objectives are intended to prepare the student to:

- Identify internal competitive intelligence information requirements and match appropriate resources to them.
- Identify and evaluate relevant external information resources to support a company's competitive intelligence initiatives.
- Effectively plan, execute, modify, and analyze complex information searches using the full command language of selected information retrieval systems and search engines on the www.
- Compare and contrast alternative approaches to competitive intelligence strategy and tactic formulation.
- Prepare a SWOT analysis to support corporate planning and decision making.
- Prepare and present targeted competitive intelligence briefings.

As a result of the course redesign, enrollment has never been stronger. Student evaluations at the end of the course and after graduations have been consistently high, and several students have expressed interest in continuing their CI studies in the graduate program.

5. GOVERNOR'S SCHOOL

Knowledge management and competitive intelligence functions are a growing area of emphasis in IS work, so it is important to introduce students at an early stage to their importance from both a theoretical and practical perspective. In the summer of 1999, the College began offering a concentration in CI for high school students selected for the Governor's School of Excellence in Information Technology. The purpose of the Governor's School is to encourage exceptional students to pursue careers in information technology, and to understand and experience information technology in a variety of problem domains.

To this end the program is designed to:

- Acquaint students with the most modern developments in information technology through a series of core courses.
- Provide motivation to the students by engaging them in individual projects similar to those they would encounter in their careers.
- Develop a sense of teamwork and cooperation by engaging students in group projects under realistic time and resource pressure.
- Provide opportunities through guest lectures and field trips to view the excitement, energy, and

opportunities available in the information technology field.

For a variety of obvious reasons, it is impossible to design a single program that satisfies the interests of a diverse and inquisitive population of very bright students. In response to this situation, students may choose from several special interest tracks that are goal-directed and driven by group projects directed by College faculty. These tracks provide students with the opportunity to work together and experience the satisfaction and the rigors of producing one or more information technology products in the area of interest they have selected. Our aim is to provide an experience that is not only intellectually challenging, but that also imparts insights into the "real world" of information technology research and development.

The CI track involves students in the process of learning effective information retrieval and analysis skills with learning reinforcement through use of electronic scavenger hunts, strategy software and war games. Students work with corporate and academic partners to analyze competitive information and suggest appropriate corporate strategies. This track consists of three modules:

- GSIT 215 - Competitive Intelligence
- GSIT 217 - Information Management Tools
- GSIT 240 - Information Security and Privacy: Legal and Ethical Issues

In addition to these track selections, all students attend a set of core courses and several concentration courses. Students are provided instruction sessions interspersed with guided and independent practice in the critical skills of information retrieval such as question formulation, source identification, information retrieval, source validation, and content analysis. To reinforce these skills, student teams participate in strategy-based information retrieval exercises and games, war games and other learning activities related to such topics as community awareness, e-commerce, industry, or infotainment.

As part of an ongoing effort to design CI systems, student teams work with corporate and academic partners to (1) evaluate published intelligence from a variety of information resources and (2) create strategic reports for corporate partners. This track combines faculty presentations, guest lectures and field trips with access to print and electronic resources.

6. CONCLUSION

To ensure that the curriculum aligns with the needs of organizations, the competitive intelligence program integrates the insights and recommendations of practitioners and consultants and the core competencies identified by the Society Competitive Intelligence Professionals into the development effort. The CI Certification program is taught entirely online and the

other three are taught on-site, but practitioners and corporate executives are actively involved in each component at all levels, and they are encouraged to comment and advise on course content, instructor effectiveness and student work.

The program has created new opportunities for collaboration with industry as well as other academic disciplines. The curriculum has received widespread support; and efforts are underway to further modularize the content for international continuing education. This is a result of increased industry awareness of the strategic synergies and co-branding potential of the content.

7. REFERENCES

- Anonymous, 1995, Salary Survey. Competitive Intelligence Review, Summer.
- Anonymous, 2000, "1997 Salary Survey Results." [online] <http://www.scip.org/ci/salariesurvey.html>. Accessed July 1, 2000.
- Anonymous, "What is CI?" [online] [date unknown] <http://www.scip.org/ci/> Accessed July 13, 2000.
- Gower, Joseph, 1999, "The Academy and CI: Thoughts on an Emerging Profession." Competitive Intelligence Magazine Volume 2, Issue 4, October-December, pp.32-34.
- Kristl, Carol, 1999, "UCLA Library School Drops the "L" Word." American Libraries Volume 30, Issue 6 June/July, pp.34-36.
- Prescott, E. John, 1999, "Debunking The 'Academic Abstinence' Myth of Competitive Intelligence." Competitive Intelligence Magazine Volume 2, Issue 4, October/December, pp.22-27.
- St. Lifer, Evan and Rogers, Michael, 1998, "ALISE Cutting the "L" word from Mission?" Library Journal Volume 123, Issue 3, February 15, p. 97.